T.E. (Computer Sem VI) <u>Assignment -2</u> Artificial Intelligence (CSC604)

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<u>Assignment 2:</u>

Considering the following objectives :

CSC604.1: To grasp the fundamental concepts and methods involved in creating intelligent systems.
1. CSC604.2: Ability to choose an appropriate problem solving method and knowledge representation technique.
2. CSC604.3: Ability to analyze the strength and weaknesses of AI approaches to knowledge–intensive problem solving.
3. CSC604.4: Ability to design models for reasoning with uncertainty as well as the use of unreliable information.
4. CSC604.5: Ability to design and develop AI applications in real world scenarios.

A) what are the key considerations in designing an expert system that effectively utilizes knowledge representation techniques to handle uncertainty and unreliable information, while ensuring practicality in real-world applications?
 B) Additionally, how do these considerations align with the strengths and weaknesses of various AI approaches to knowledge-intensive problem solving?"

1. Rubrics for the First Assignments:

Indicator	Average	Good	Excellent	Marks
Organization (2)	Readable with some missing points and structured (1)	Readable with improved points coverage and structured (1)	Very well written and fully structured	
Level of content(4)	All major topics are covered, the information is accurate (2)	Most major and some minor criteria are included. Information is accurate (3)	All major and minor criteria are covered and are accurate (4)	
Depth and breadth of discussion and representation(4)	Minor points/information maybe missing and representation isminimal (1)	Discussion focused on some points and covers themadequately (2)	Information is presented indepth and is accurate (4)	
Total				

Signature of the Teacher

AI ASSIGNMENT-2

A) Key considerations in designing an expert system are:

(i) Knowledge Representation Techniques :-
Choose appropriate techniques such as Bayesian networks, fuzzy logic, or Dempster-Shafer theory to represent uncertain or unreliable information effectively.

(ii) Uncertainty Handling :-
Implement mechanisms to quantify and manage uncertainty in the knowledge base, enabling the system to make decisions even when information is incomplete or ambiguous.

(iii) Incorporating Domain Expertise :-
Ensure that the expert system incorporates domain-specific knowledge effectively, either through direct input from domain experts or through knowledge acquisition techniques.

(iv) Validation and Verification :-
Rigorously test the expert system to ensure that it behaves as expected under various conditions, including scenarios with uncertain or unreliable information.

(v) Scalability and Performance :-
Design the system to be scalable and efficient, capable of handling large amounts of data and making timely decisions in real-world applications.

B) Alignment with strengths and weaknesses of AI approaches :

(i) Strengths :

(a) Techniques like Bayesian networks and fuzzy logic excel at handling uncertainty and unreliable information, aligning well with the objective of designing models for reasoning under uncertainity (CSC 604.4).

(b) Expert systems, when properly designed, can effectively leverage knowledge representation techniques to solve complex problems in specific domains, aligning with the objective of knowledge-intensive problem-solving (CSC 604.3).

(ii) Weaknesses :

(a) Some AI approaches may struggle with scalability and efficiency, particularly when dealing with large amounts of uncertain or unreliable data, which could impact the practicality of real-world applications (CSC 604.5).

(b) Over-reliance on domain experts for knowledge acquistion in expert systems can introduce biases or inaccuracies, potentially undermining the system's effectiveness (CSC604.2).

(c) Validation and verification of expert systems can be challenging, especially when dealing with uncertainty, as it may be difficult to establish ground truth for testing purposes (CSC 604.3).